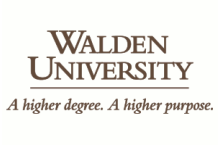

2020

Impact of District-Wide Free Lunch on Third-Grade Studentsâ Reading Comprehension

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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2020

Abstract

Impact of District-Wide Free Lunch on Third-Grade Students' Reading Comprehension

by

Rita A. Williams

MSSW, University of Tennessee, 1989

BA, LeMoyne-Owen College, 1979

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Human Services

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August 2020

Abstract

Poverty has an enormous impact on children and their success in school. Children with low economic status often perform poorly in math and reading. Poor reading skills often lead to truancy, low rates of high school graduation, low-paying jobs, and cycles of illiteracy in generations of families. The fundamental cause theory was the theoretical lens used for this study. The purpose of this quantitative, comparative ANOVA quartile split study was to examine the impact of universal free and reduced lunch (FRL) policy changes on third grade reading normal curve equivalent (NCE) scores. The research design included data analysis for examining the differences in third grade reading NCE scores in schools before and after the policy change to 100% FRL. I collected secondary data from the Tennessee Department of Education website. The findings from this 1-way ANOVA indicated there are no statistically significant differences in NCE third grade reading scores after the policy change to 100% FRL. The social implications of these findings offer the potential to raise awareness of universal FRL and its impact on reading comprehension among third grade students in the educational setting, enabling policy changes in the United States Department of Agriculture's core nutrition program for FRL to children regardless of socioeconomic status.

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Dedication

I would like to dedicate this dissertation to my family. To my parents, Mr. and Mrs. George Marshall Jr., who were and are still excellent role models who shaped my morals and values in life. To my dear children, DeShawn, Demetria, TaMeka, and Mitch Jr., my hope is that I have been a good role model and that you continue to persevere and work hard to achieve all your dreams. To my grandchildren, Steven, Michael, Kyeauna, Madison, Tre, and Alexis as well as my great-grandchildren, Aston, Zadie, and Rhylee, I pray that I leave a legacy for each of you. Finally, to my supportive siblings, Robert, Claudette, Maxine, William, Frank, George Randy, and Eunice, thanks for taking care of me throughout my life.

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A special thanks to all my family, the Dye and Marshall village of supporters, where education is not an option but an expectation.

To Brenda, we started this journey together and I will continue to walk with you as you finish the distance.

A special thanks to my professional colleagues for your continued encouragement through this dissertation journey.

For truly, this has been a journey!

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Chapter 1: Introduction to the Study

In 2018, poverty affected 39.7 million Americans, and 17.5% were children (U.S. Department of Commerce, 2018). In 2017, nearly 1 in 5 infants, toddlers, and preschoolers between the ages of 0 and 5 were classified as poor at the time of most significant brain development (U.S. Department of Commerce, 2018). Poverty among children has an enormous negative influence on their school success, with the main reasons being suffering from food deprivation and poor access to adequate health care (Hair, Hanson, & Wolfe, 2015).

Poverty and parental education status are associated with the quality of a child's educational experiences and academic achievement, whether attending public school, private school, or homeschool (U.S. Department of Commerce, 2014). For example, childhood poverty correlates with poor academic achievement starting in kindergarten and extending through elementary and high school, leading to meager rates of high-school graduation (U.S. Department of Commerce, 2014). Researchers have long associated low family economic statuses with poor academic performances among children in math and reading (Amendum & Fitzgerald, 2013). One significant predictor of standardized reading comprehension tests in Grades 1 through 12 is the percentage of children who live in poverty (Bhattacharya, 2015). Reading skills lower than basic reading ability can result in truancy and low-paying jobs, contributing to the cycle of illiteracy in the next generation (Alharbi, 2015).

This chapter includes background information on the impact of policy changes within the universal free and reduced lunch (FRL) programs on third grade reading

Normal Curve Equivalent (NCE) scores. In this chapter, I also discuss the purpose of this study, introduce the research question and hypotheses as well as the theoretical framework, present some key terms, and explain the significance of this research topic.

Background

Children who perform poorly in the academic setting starting as early as kindergarten and extending through elementary and high school often experience lower rates of high-school graduation (Amendum & Fitzgerald, 2013; Hutchison et al., 2014). Children of low SES often perform poorly in academics, experience chronic absenteeism from school, and attain low-paying jobs as an adult (Bhattacharya, 2015). Children of low SES also often perform poorly in math and reading (Bhattacharya, 2015). Poor reading skills among children often lead to truancy and low-paying jobs as adults (Amendum & Fitzgerald, 2013). Children who do not master reading by third grade may experience academic problems throughout the rest of their school process (Amendum & Fitzgerald, 2013).

The National Lunch Act of 1946 federally funded meal program is in over 100,000 public and nonprofit schools and care facilities (U.S. Department of Agriculture [USDA], 2016a). The Healthy, Hunger-Free Kids Act of 2010 included the National School Lunch Program (NSLP) and the School Breakfast Program, which are now part of the new universal meal program. The Community Eligibility Program (CEP) is also included in The Healthy, Hunger-Free Kids Act of 2010 and allows schools to serve meals to students at no cost, eliminating the need to collect eligibility data (U.S. Department of Education, 2016a).

Huang and Youngmi (2015) conducted a study to evaluate if children receiving free or reduced-price lunch have higher food insufficiency rates in summer months than during the regular school year. They explored the association between children who participate in the NSLP and household food insufficiency over 10 months. Data were collected using the Survey of Income and Program Participation, and the researchers conducted a linear growth curve analysis in the multilevel modeling factors. The results of their study showed that heads of households that included children receiving FRL were more likely to be single, African American, female, unemployed, and have a lower educational background than those whose children were eligible but did not receive FRL (Huang & Youngmi, 2015).

Problem Statement

In 1946, the National School Lunch Act created the modern school lunch program with the multifaceted goals of providing a means of safeguarding the health and well-being of U.S. children and promoting household consumption of nutritious foods (USDA, 2016a). Proper nutrition plays a role in providing sufficient development in life for the physical, mental, and social development of children (Rasberry, Slade, Lohrmann, & Valois, 2015). Hence, policymakers have given increased attention to school meals as a means of improving the nutrition and academic performance of low-income children (Leos-Urbel et al., 2013). In 2010, the NSLP introduced the CEP of the Healthy, Hunger-Free Kids Act, Section 104a (USDA, 2015). The CEP is a universal meal program that allows eligible districts and schools with high percentages of students living in poverty to receive meals at no charge (Tennessee Department of Education, 2016a). The Healthy,

Hunger-Free Kids Act became available to high-poverty schools nationwide in the 2014–2015 school year, and it has affected 8.5 million students who receive two free meals a day at school (USDA, 2015). The improved nutrition of children is linked to increase in academic outcomes and cognitive performance (Hair et al., 2015).

Although there is extensive research regarding poverty and reading comprehension among children, I found no research concerning whether changes in policy to universal FRL for students influence NCE scores in reading. More specifically, I found no research examining the quartile split (i.e., Q3Q1) of FRL on the differential of NCE reading scores before and after the policy change. Given such, further research could examine the quartile split (i.e., Q3Q1) of FRL on the differential of NCE reading scores before and after a policy change to address the documented problem of poor reading comprehension among third grade students (Spencer, Wagner, & Petscher, 2019).

Purpose of the Study

In this quantitative, comparative study, I examined the impact of policy change on universal FRL on third grade NCE reading scores. Specifically, I compared the different extremes of low, middle, and high levels of FRL in relation to NCE reading scores before and after FRL policy changes. The use of a Q3Q1 split enabled me to examine which schools, based on SES of percentage of FRL, benefited the most from this policy change. Splitting FRL into quartiles (Q3Q1) before the policy change enabled me to see if this policy benefited students in schools with low, middle, and high levels of FRL.

Significance

The findings from this study include information about significant differences between universal FRL and third grade NCE reading scores. The results of this study offer the potential to influence social change. Specifically, the findings provide educational systems with information to raise their awareness of the reading scores of schools that serve free lunch to students. As a result, enabling administrators to implement actions to close the gap on the documented problem of low reading comprehension among third grade students (Spencer et al., 2019). In addition, this information could bring about policy changes in the USDA's core nutrition program for free lunch to children regardless of SES. The results of this study will be made available to educational institutions that are eligible to participate in the CEP of FRL but have not done so.

Research Question and Hypotheses

RQ1: What are the differences in third grade reading NCE scores before and after the policy change to 100% FRL?

H_0: $\mu^1 = \mu^2 = \mu 3$ – There are no differences in third grade reading NCE scores before and after policy change based on levels of FRL prior to policy change.

H_1: $\mu^1 \neq \mu^2 \neq \mu 3$ – There are differences in third grade reading NCE scores before and after policy change based on levels of FRL prior to policy change.

Theoretical Framework

The fundamental cause theory (FCT) and its impact on reading was the theoretical lens used in this study (see Phelan & Link, 1995). The FCT includes how health

inequalities at the social level can persist or even increase, despite general public health improvements, by turning attention to the fundamental factors putting people "at risks of risk" (Qasim, 2016, p. 80). FCT theorists have suggested that SES represents an array of resources, including money, knowledge, prestige, power, and beneficial social connections (Qasim, 2016). In using this theory, I sought to understand the specific differences between SES, the resources of FRL for students regardless of SES, and the impact on students' reading (i.e., cognition). Hence, this theory provided the lens through which I connected the differences between the universal FRL initiative policy and third grade reading NCE scores among students. The FCT provided a solid framework for thinking about how health inequalities may persist over time in spite of improving medical and social circumstances. Still, there is a need for further research and the application of FCT to answer whether universal free lunch for children regardless of SES has an impact on reading comprehension scores among third grade students (Oversveen, Rydland, Bambra, & Eikemo, 2017).

Nature of the Study

In this study, I employed a comparative, quantitative, ANOVA, Q3Q1 split design using secondary data analysis. The purpose of this study was to examine the impact of the universal policy change to FRL for students on third grade reading NCE scores. Pre- and posttests were used to determine whether the means of three groups (i.e., students' third grade reading NCE scores before and after universal free lunch) were different in a statistically significant way before the change to FRL (i.e., 2013) and the year after the policy change (i.e., 2014).

The NCE third grade reading scores used in this study came from official school data from the Tennessee Department of Education (2016b). The independent variable (IV) was the universal FRL, which I compared to NCE reading scores before and after the policy change. The dependent variable (DV) for this study was the difference in NCE third-grade reading scores between 2013 and 2014. I conducted an ANOVA Q3Q1 split as one of the three points that divided a range of the FRL before policy change into three quartiles. The three quartiles are Q3 at 75th percentile, Q1 at 25th percentile, and Q2 at 50th percentile. The Q3Q1 split was conducted to assess whether the means of the DV was significantly different among the three groups. Schools with lower FRL, middle FRL, and high FRL before the policy change were the three groups used. FRL is an indicator of SES, so I wanted to see how the extreme FRL/SES schools were impacted by this policy change.

The NCE is a way of measuring where students fall along the normal curve. NCE line numbers run from 1 to 99 and indicate an individual student's rank or how many students out of a hundred had a lower score (Ebert & Scott, 2014). The lowest score is 1 and 99 is the highest, and these scores follow the National Percentile (NP) score when reviewing achievement test reports (Vinovskis, 2015). NCE scores have a preset mean of 50 and a standard deviation of 21.05 (Ebert & Scott, 2014). Scores of NCEs and percentiles are the same at 1, 50, and 99; however, the interpretation of scores are different (Elbert & Scott, 2014).

The IV eligibility criterion is based on the CEP that allows eligible districts and schools with high percentages of students living in poverty to receive meals at no charge

(Tennessee Department of Education, 2016a). The IV for the group of schools that changed to FRL came from the official data of the Tennessee Department of Education and the CEP of the Healthy, Hunger-Free Kids Act. The DV came from the official records of the Tennessee Department of Education. The Tennessee Department of Education has deemed the NCE reliable and valid as an assessment tool (Tennessee Department of Education 2016b). The sampling population was the schools in Tennessee that made the switch to 100% FRL in 2014. These schools had the option to offer free school meals to all children in those schools without collecting applications to qualify for free or reduced-cost meals (Tennessee Department of Education, 2016a). I used the Statistical Package for Social Sciences (SPSS) for data analysis. In Chapter 3, I provide a full summary of the method, design, and sampling procedures for this study.

Definitions of Terms

Adequate Yearly Progress (AYP): The NCLB defines as requiring the same high standards of academic achievement for students in the No Child Left Behind Act (U.S. Department of Education, 2016b). AYP requires continuous and substantial academic improvement for students and provides separate measurable annual objectives for achievement for students of each racial/ethnic groups, economically disadvantaged students, students with disabilities, students with limited English proficiency, and graduation rates for high school students (U.S. Department of Education, 2016b).

Community Eligibility Provision (CEP): Under Section 104a of the Healthy, Hunger-Free Kids Act for the NLSP and School Breakfast Program, this provision gives local educational agencies (LEAs) and schools with a high percentage of low-income

children the option to offer free school meals to all children in those schools without collecting applications to qualify for free or reduced-cost meals (USDA, 2015).

Free and reduced lunch (FRL): Meals for children who are unable to pay full price for lunch free of charge or at a reduced price (USDA, 2015).

Assumptions

According to Fields (2017), the first assumption that underlies the use of ANOVA is that the observations are random and that the sample taken from the populations is independent of each other. The value of one observation should not be related to any other observation (Field, 2017). The second assumption that underlies the use of ANOVA is the homogeneity of variance, which assumes that the variance of the distributions in the populations is equal (Field, Miles, & Field, 2017). The third assumption that underlies the use of ANOVA is normality, which means that the population from which the samples are taken is normal. The DV (i.e., differential NCE third grade reading scores of 2013 minus 2014) is normally distributed in each group. In this study, I assumed that the instrument of this study, the NCE scores, includes data that are compatible with SPSS, which was the statistical analysis software used. The research population is representative of elementary students' NCE scores in the third grade. I retrieved data directly from the Department of Tennessee website and placed it into SPSS.

Limitations

In this study, I used an ANOVA, Q3Q1 quartile split to examine the differential of NCE reading scores before and after the FRL policy change. According to Campbell and Stanley (1963), the three-group pre- and posttest design are widely used in the

educational setting for research. For this study, I obtained the NCE reading scores for third grade students from the Tennessee Department of Education. Campbell and Stanley identified the threats to the internal validity of history, maturation, testing, instrumentation, statistical regression, selection of participants, mortality, and interaction of history and treatment. In using the three-group, pre- and posttest design, historical events beyond the FRL were a threat to internal validity, which I took into consideration in an attempt to mitigate the threat (see Campbell & Stanley, 1963). Another limitation of this study was that the data were only available at the school level, not the individual student level, and were limited to third grade students only.

Scope and Delimitations

The findings from this research study have the potential to inform school districts of the impact of district-wide free lunch on reading comprehension among third grade students. This study took place within the school districts that participated in the CEP and may apply to other areas. Although this study took place in the southeast region of the United States, it can also extend to school districts in other states with high-poverty schools that are eligible to participate in the CEP (see USDA, 2015). This study was delimited to only those schools in the southeast region of the United States whose school administrators had made this change in policy.

Summary

This research study on district-wide free lunch and its impact on reading comprehension among third grade students has the potential to influence social change in schools that serve free lunch to students. The findings of this research study have the

potential to provide the educational system with the awareness of universal FRL and its impact on reading comprehension among third grade students. Children who do not master reading by third grade often falter in later grades and are more likely to drop out of school, at a rate 4 times that of proficient readers (Spencer et al., 2019).

Chapter 2 contains details of the history of FRL and the gap in literature this research study addressed. In this chapter, I also provide a synthesis of previous research on this general topic, previous theories, and essential background information on the instrument used for this research study. Additionally, the literature review includes areas that researchers have explored in the hope of starting to improve third grade reading comprehension.

Chapter 2: Literature Review

This chapter includes an overview of a variety of scholarly articles focusing on universal free lunch and its impact on reading comprehension among third grade students. I begin the literature review with a brief history of the NSLP, followed by a detailed description of Section 104a of the Healthy, Hunger-Free Kids Act and the CEP Universal Meal Program under this section of the act. A brief description of the No Child Left Behind Act 2001 follows. In the next sections, I discuss the NCE and focus on theories of nutrition, school health, and the FCT. The literature reviewed in this chapter provides research outcomes justifying why this topic is important and establishes the need for research addressing the problem of reading comprehension among third grade students.

Literature Review Search Strategy

I located literature for this chapter from a variety of databases, including PsycINFO, PsycARTICLES, Google Scholar, Education Source, Academic Search Complete, Dissertations and Thesis, Tennessee Department of Education, SocINDEX, ERIC, and SAGE Premier, in the form of full-text, peer-reviewed articles published from 2011–2019. All these databases, apart from Google Scholar and the Tennessee Department of Education, were accessed through the Walden University Library. Search terms included *free and reduced lunch, history of National School Lunch Program, Community Eligibility Provision, socioeconomic status,* and *comprehensive reading among third graders*. The total number of articles I reviewed for this study is 120.

History of National School Lunch Program

The history of the Child Nutrition Act of 1966 includes a new dimension to school food services for children (USDA, 2014). According to Section 2 of the Child Nutrition Act of 1966, the connection between food and proper nutrition and the ability of children to develop and learn influenced the decision of the government to extend, expand, and strengthen such programs as the NSLP to safeguard the health and well-being of U.S. children as well as to advocate for the domestic consumption of agricultural and other foods by providing financial assistance to states through grant-in-aid and other revenues to meet the nutritional needs of children (Huang, & Youngmi, 2015). Table 1 displays the progression of the history of the Child Nutrition Act of 1966.

Table 1

History of the Child Nutrition Act of 1966

Characteristics	Year	Program
Nonprofit institutions	1954	School Milk Program
State educational agencies	1966	Pilot Breakfast Program
Program extended and expanded	1966	Child Nutrition Act

Note. From "National School Lunch Program: Annual Summary," by U.S. Department of Agriculture, Food and Nutrition Services, 2015. Retrieved from https://www.fns.usda.gov/sites/default/files/pd36slmonthly.pdf.

In 1968, the National School Lunch Act of 1966 was amended by adding several sections, starting with Section 9 concerning nutritional eligibility: "except that such minimum nutritional requirements shall not be constructed to prohibit substitution of foods to accommodate the medical or other special dietary needs of individual students"

(USDA, 2015, p. 41). Congress also added a new section extending the criteria for participation in the program to include children in institutions that provide services to private, nonprofit, or public institutions (USDA, 2015). Such institutions include child daycare or other forms of childcare where children are in residential services, areas where children are in poor economic conditions, and areas with high concentrations of working mothers and daycare services for disabled children (USDA, 2014).

Healthy, Hunger-Free Kids Act of 2010

President Barack Obama signed the Healthy, Hunger-Free Kids Act on December 13, 2010, reauthorizing various child nutrition programs until September 30, 2015 (USDA, 2015). These amendments were the first significant changes to this act in over 15 years (USDA, 2015). These programs included the NSLP and School Breakfast Program; the Special Supplemental Nutrition Program for Women, Infants, and Children; the Child and Adult Care Food Program, the Summer Food Services Program; the Afterschool Meal Program; and the Supplemental Nutrition Assistance Program Education and had the primary purpose of feeding children nutritious meals and preventing childhood hunger (Beck, Danielson, & McConville, 2015). This legislation provided $4.5 billion in additional new resources for those programs (USDA, 2014). The act mandates low sodium, 100% whole grain, and sugar cuts; more watchful calorie intake by grade level; and supplying a fruit or vegetable on every plate (Beck et al., 2015). Almost all public schools in the United States take part in the NSLP, which allows them to serve FRL to children who qualify (Beck et al., 2015).

In 2014, changes in regulations created challenges for many district food programs. The USDA (2014) NSLP New Smart Snacks rules eliminated junk food identified by the USDA in schools in 2014. A suburban Chicago school district, realizing it would lose more funds than it took in, decided to opt-out of the USDA's NSLP in response to strict new federal health regulations (USDA, 2014). However, many school districts nationwide could not afford to give up federal funds, forcing administrators to come up with creative ways to encourage students to eat the new healthier food requirements by the federal rules (Beck et al., 2015). According to the USDA (2014), states are now required to conduct in-depth, 3-year reviews covering financials, menus, nutritional analysis, health inspections, and other practices as opposed to the previous reviews taking place every 5 years in schools.

Community Eligibility Provision

The CEP of the Healthy, Hunger-Free Kids Act of 2010 is a universal meal plan that gives LEAs and schools in low-income areas an alternative method for operating school meal programs (USDA, 2014). Under the CEP, eligible districts and schools provide meal services to all students regardless of economic status (USDA, 2014). The eligibility criterion to qualify is based on the CEP meal program that allows eligible districts and schools with high percentages of students living in poverty to receive meals at no charge (Tennessee Department of Education, 2016a).

The CEP pilot began in selected states starting in the 2011–2012 school year and became available nationwide for the 2014–2015 school year for all states eligible to participate, enabling high-poverty schools and school districts to reduce hunger and

making school meals programs more efficient to children (USDA, 2015). CEP has been implemented in 11 states and serves approximately 4,000 high-poverty schools (USDA, 2015). Schools can provide breakfast and lunch free to students enrolled in CEP without having families complete an application process (USDA, 2015). Schools that accept the pilot program are reimbursed using a formula based on the percentage of students categorically eligible for free meals based on their participation in other programs, such as the Supplemental Nutrition Assistance Program and Temporary Assistance for Needy Families, which are identified as other specific, means-tested programs (USDA, 2015). Universal free school lunch removes the stigma, improves children's health and education, and helps low-income families make ends meet (USDA, 2014). Removing the administrative processes of qualifying for the program allows schools, principals, and teachers to focus on teaching (Brown & Bilski, 2017).

No Child Left Behind Act of 2001

In January of 2001, 3 days after President George Bush took office as the 43rd President of the United States, he introduced NCLB as his framework for bipartisan education reform for students (U.S. Department of Education, 2015). NCLB reauthorized the Elementary and Secondary Education Act 2001, which is the primary federal law on kindergarten through high school education (Kirkham & Lampley, 2014). The four principles of the NCLB are (a) accountability, by requiring states to put in place statewide accountability systems based on challenging state standards in reading and mathematics; (b) more choices for parents and students, especially those attending low-performing schools; (c) more local control and flexibility for states and LEAs in the use

of federal education funds; and (d) a focus on what works based on scientific research with a stronger emphasis on reading, in particular for young children (U.S. Department of Education, 2015). According to Kirkham and Lampley (2014), in September of 2011, the U.S. Department of Education enacted the requirements that students read on grade level by 2014.

Since 2001, NCLB literacy has become the center of attention for educational legislation to provide more resources to enhance reading skills for children by the end of his or her third grade year (U.S. Department of Education, 2015). Furthermore, the introduction of the new Reading First Initiative significantly increased the federal investment in scientifically based reading instruction programs for children in early grades to meet this goal (Gurses & Bouvet, 2015; U.S. Department of Education, 2015). One significant benefit of this approach was to reduce the placement of children in special education services due to a lack of appropriate reading instruction in their early years (U.S. Department of Education, 2015). States that received funds from the 6-year grant provided local recipients with the ability to administer screening and diagnostic assessments to identify students in Grades K–3 who are at-risk of reading failure and to provide more professional development for K–3 teachers in essential components of reading instruction (Gurses & Bouvet, 2015; U.S. Department of Education, 2015).

The process of reading proficiency is one of the necessary fundamental skills that enhance academic success in schools (Capellini, Pinto, & Cunha, 2015). In the United States, having the ability to read has essential links to how much a person can achieve in his or her personal and professional life (Fives et al., 2014).

Reading Comprehension

Reading is a complex series of steps that depend on several factors (Yildiz & Cetinkaya, 2017). According to LaBerge and Samuels (1974), automatization theory holds that attention is a prerequisite to both reading fluency and reading comprehension. Prior to children entering school and before learning to read, children learn vocabulary primarily from social interactions with people in their environments (Quinn, Wagner, Petscher, & Lopez, 2015). LaBerge and Samuels examined the relationship between good readers' attention, reading fluency, and reading comprehension among children. Proficient reading skills require the reader to pay attention to what is read because these skills provide an active preparation of steps during which the reader strives to read the text thoroughly (Yildiz & Cetinkaya, 2017). Rates of vocabulary development among children vary widely with some of this variability accounted for by differences in parent language and family background factors (Quinn et al., 2015). Ness (2016) conducted a mixed-method study on reading comprehension strategies in secondary content area classrooms to examining teachers' use of and attitudes towards reading comprehension instruction. In this study, the qualitative findings showed that teachers did not feel they had the necessary skills for teaching specific instruction on reading comprehension. Ness posited that the reported pressure teachers felt in trying to cover the required content to prepare students for state standardized tests created barriers to them providing reading instruction to students.

Reading can be interpreted as an interactive process between the reader and the text (Flores & Duran, 2016). Ness (2016) posited eight reading comprehension strategies

for readers: comprehension monitoring, cooperative learning, graphic and semantic organizers, story structure, question answering, question generation, summarization, and multiple strategy instructions. Comprehension monitoring refers to readers learning how to be aware or conscious of their understanding of what is being read and learning various techniques to help them with comprehension (Flores & Duran, 2016). According to Gurses and Bouvet (2015), for successful reading comprehension to occur, the reader integrates various pieces of information from the text and interprets this information by combining it with his or her background knowledge. Cooperative learning is the process by which readers work together to learn strategies in the context of reading more efficiently (Ness, 2016). Graphics and semantic organizers allow the reader to write or draw the meanings and relationships of the ideas that underlie the words in the text (Ness, 2016). Story structure allows the reader to learn to ask and answer who, what, where, when, and why questions about the plot and, in some instances, map out the timeline, characters, and event in stories after reading the passage (Flores & Duran, 2016). Question answering refers to when the reader answers questions posed by the teacher and receives feedback on the correctness of their answers (Flores & Duran, 2016). Question generation refers to when the reader asks himself or herself why, when, where, why, what will happen, how, and who questions after reading a passage (Flores & Duran, 2016). Summarization refers to when the reader attempts to identify and write the main ideas that integrate or unite the other ideas or meanings of the text into a whole coherent approach (Ness, 2016). Multiple strategy instructions are when the reader uses several procedures simultaneously with the teacher while reading the text (Ness, 2016). Multiple-

strategy teaching is useful when the procedures are used flexibly and appropriately by the reader or the teacher in naturalistic contexts (Ness, 2016).

A reader is considered an active subject who has some previous knowledge, specific abilities, and motivation for reading and who looks at a text that in turn contains a specific intent, structure, and level of difficulty (Flores & Duran, 2016). Developing reading competence is a crucial skill developed throughout an individual's lifetime and provides readers with the necessary skills for the development of independent reading and being able to handle any type of reading test (Flores & Duran, 2016).

Reading comprehension and attention involves the process of selecting some of the potential sensory inputs, such as transferring knowledge from sensory memory to short-term memory to carry out further processing among readers (Yildiz & Cetinkaya, 2017). Several studies have shown that poor temporal processing (TP) skills of auditory and visual stimuli are linked to reading difficulties and individuals (Malenfant et al., 2012). TP is a widely used term to describe low-level perception and information processing of the temporal characteristics of sensory stimuli in any modality, such as sequence steps, gap detection between stimuli, or stimulus duration and or movement among readers (Malenfant et al., 2012). Self-concept is another reader attribute that is relevant to developing reading competence, as both self-concept and academic achievement generate positive attitudes towards schoolwork and participation among readers (Flores & Duran, 2016).

Normal Curve Equivalent Scores

NCE is norm-referenced test scores that compare student performance nationally or locally (Ebert & Scott, 2014). The NCE is a way of measuring where students fall along the normal curve. NCE line numbers run from 1 to 99, which indicate an individual student's rank, or how many students out of a hundred had a lower score (Ebert & Scott, 2014). The lowest score is 1 and 99 is the highest and follows the NP when reviewing achievement test reports (Whitford, Zhang, & Katsiyannis, 2018). NCE scores have a preset mean of 50 and a standard deviation of 21.05 (Ebert & Scott, 2014). Scores of the NCE and percentiles are the same at 1, 50, and 99; however, the interpretation of scores are different (Whitford, et al., 2018). A standardized test is administered the same way to all students, and evaluators follow all rules and are permitted to change materials or reword questions (Ebert & Scott, 2014). Norm-reference tests are designed to rank test takers on a bell curve or distribute scores that are shaped when graphed, which form the outline of a bell (Whitford, et al., 2018).

Standardized, norm-referenced tests assess many areas, such as intelligence and academic skills (Ebert & Scott, 2014). Standardized tests limit students' learning as the focus is on cognitive dimensions, ignoring many other qualities that are essential to student success (Whitford, et al., 2018). The term *standardized tests* are often heard along with *high-stakes* and are administered, scored, and interpreted consistently so that performances of large groups of students can be compared (Vinovskis, 2015). Standardized tests have different effects on various populations of students and usually

lead to significant limits on learning among poor and minority students (Elbert & Scott, 2014).

Since the enactment of No Child Left Behind Act in 2002, parents' and teachers' opposition to the law's mandate to test every child each year in grades three through eight have been intensifying (Vinovskis, 2015). States were required to bring all students to the proficient level on state tests by the 2013-14 school year, although each state was able to decide on what proficiency should look like and which test to use (Vinovskis, 2015). Critics have claimed that high-stakes assessments produce anxiety among students and teachers, turning classrooms into test-preparation factories instead of learning laboratories (U.S. Department of Education, 2015).

In 2013, almost 6,000 Tennessee students earned a score classification of below basic—the lowest of the four classifications (below basic, basic, proficient, and advanced) on the third grade English, language, and art test. Only one third of the below students improved to a basic level on their fifth grade assessment and less than three percent—only 142 students of the original 6,000—met grade-level expectations by attaining proficiency by fourth grade (Tennessee Department of Education, 2016a). Data from Tennessee and across the nation demonstrate the importance of early reading success toward later life success for children (Tennessee Department of Education, 2016a). Therefore, districts and schools in Tennessee have made reading for students a central priority in their daily schedules (Tennessee Department of Education, 2016b).

The next section of this study gives an overview of theories related to nutrition and reading literacy among students. Due to the complexity of literacy, one theory is

usually not sufficient for explaining the benefits and processes of literacy and the connection between reading and writing among students (Kirkham & Lampley, 2014). Teachers should be aware but usually are not equipped with specific training as to what theories to apply to read, writing, and generalized literacy when teaching children (U S Department of Education, 2015).

Behavior Engagement and Reading Achievement

Goo, et al. (2015) examined the cross-lagged relation between behavioral engagement and reading achievement in elementary school-age children and the role of family low SES and mid- or high-SES students. Goo et al. (2015) hypothesized that there would be a bidirectional achievement for elementary-aged students based on conceptual and empirical evidence. They evaluated students' behavioral engagement and reading in preschool, first grade, third grade, and fifth grade (Goo et al., 2015). The results of this study showed that reading achievement in preschool influenced subsequent behavioral engagement in first grade, and reading achievement in third grade predicted subsequent behavior engagement for students in fifth grade (Goo et al., 2015). Kim, Park, and Park (2015) pointed out that mastery of reading fluency before currently established benchmarks is a significant positive predictor of later reading skills among students in lower grades (primary) grades even after student demographic information and initial reading levels are controlled. The results of the findings by Kim, et al. (2015), provides more documentation for the importance of early reading skills, early intervention, and preventing problems in reading as soon as possible for students in school.

Lewallen, Hunt, Potts-Datema, Zaza, and Giles (2015) conducted a study on the whole school, whole community, and whole child model: a new approach for improving educational goals and overall healthy development for children. Lewallen et al. focused on the whole child approach and the coordinated school health approach that addressed the overall needs of students, such as physical and emotional development. However, a collaborative effort that is sufficient for both the health and education community is needed to ensure that students are healthy and academically ready to learn (Lewallen et al., 2015). During the spring of 2013, the Association for Supervision and Curriculum Development (formally known as the Association for Supervision and Curriculum Development) and the Centers for Disease Control and Prevention (CDC) gathered education and health professionals to talk about lessons learned from the execution of the coordinated school health and whole child approaches to learn about the development of a new model, which would include the awareness acquired through carrying out the coordinated school health and whole child approaches (Center for Disease Control and Prevention, 2014).

Whole Child Approach

In *The Learning Compact Redefined: A Call to Action,* the Association for Supervision and Curriculum Development welcomed communities, educators, and key legislators to work together to make sure that policies are implemented that would result in students who are successful learners who are "knowledgeable, emotionally and physically healthy, civically active, artistically engage, prepare for economic self-sufficiency, and ready for adulthood" (Center for Disease Control and Prevention, 2014,

p. 2). According to Rosas (2017), the Whole Child Approach responds with five tenets that make the student the focus: each student begins the school year healthier and learns about and practices maintaining a healthy lifestyle (Lewallen et al., 2015). It is vital that student learning is in an environment that is physical and emotionally healthy for students and adults (Lewallen et al., 2015). Each student is actively involved in the learning process and is aligned with the school and the surrounding community and has the privilege to personalize learning and the continued support of qualified, caring adults. Lastly, each student is challenged academically and better prepared for a more successful college experience (Lewallen et al., 2015).

Cognition and Reading Comprehension

Guajardo and Cartwright (2016) explored the roles of the theory of mind, counterfactual reasoning, and executive functioning in prereading mastery, reading perception, and reading comprehension, finding that cognitive processes beyond those practices associated with reading comprehension are essential to successful reading comprehension among students. Guajardo and Cartwright suggested that students who do not read by third grade are four times more likely to drop out of school compared to students that complete graduation. Fives et al. (2014) investigated to what degree children's academic self-beliefs had links to reading achievement and whether the relationship is modified by gender or age. Fives et al. collected data from students identified as at risk for reading failure in low poverty areas, and the data suggested that girls' attitudes to reading and perceived competence are more positively connected with reading achievement than boys. Kendeou, Broek, Helder, and Karlsson (2014) examined

a cognitive view of reading comprehension and the implications for reading difficulties among children. Silinskas et al. (2016) examined the effectiveness of increased support in reading and its relationship to teachers' influence, and children's motivation suggested that teachers providing individual support in reading are positively connected to the reading skills of children who were interested initially in reading.

Malenfant, et al. (2012) conducted a study to determine whether the association between TP and reading is mediated by phonological awareness (PA) in a normative sample of 615 eight-year-olds. TP is a broad term used to define low-level perception and information processing of the temporal characteristics of sensory stimuli in any modality, such as sequence order, gap detection between stimuli, and or movement among eight-year-olds (Malenfant et al., 2012). TP was measured with auditory and visual-auditory temporal order judgment tasks and PA with a phoneme-deletion task among children. According to Malenfant et al. (2012), the objective of the study was to formally test the hypothesis that TP, measured in one auditory and one visual-auditory temporal order judgment task, is associated with reading through PA in a normative sample of eight-year-olds. A complete mediation through PA would suggest that phonological pathways are the primary mechanisms by which TP indirectly affects reading among children (Malenfant et al., 2012).

Quinn, et al. (2015) conducted a study of developmental relations between vocabulary knowledge and reading comprehension among students. In this change score modeling study, a sample of students was tracked from first through fourth grades to evaluate dynamic developmental relations between vocabulary knowledge and reading

comprehension. The purpose of this study was to investigate the possibility of developing coupling of vocabulary and reading comprehension using latent change score modeling, competing models to fit the repeated measurements of vocabulary knowledge, and reading comprehension to test for the presence of leading and lagging influences among children (Quinn et al., 2015). Children learn vocabulary primarily from social interactions and significant others in their environments before school entry when learning how to read (Quinn et al., 2015). Children's rates of vocabulary development vary widely, with some of this variability accounted for by differences in parent language and family background factors. The results of this study showed that the univariate models revealed growth among children in vocabulary knowledge, and reading comprehension was evaluated by two areas: constant yearly change and change proportional to the previous levels of the variable (Quinn et al., 2015). Auld, Romaniello, Heimendinger, Hambidge, and Hambidge (1998) used a study on nutrition and Piaget's cognitive development theory to create a school program of nutrition education. The researchers hypothesized that combining social cognitive theory with the scholastic philosophies of Piaget and Dewy would influence student's behavior change and that students in the experimental classes had significantly higher knowledge and self-efficacy regarding fruit and vegetable consumption and food preparation (Auld et al., 1998).

Transtheoretical Model Stages of Change

Prochaska and DiClemente (1982) created the transtheoretical model (TTM) stages of change, another theory used in targeting health behavior among individuals. In more than 15 years of research findings offer through TTM that individuals go through a

cycle of five stages of change: precontemplation, contemplation, preparation, action, and maintenance in the adoption of healthy behaviors or halting of unhealthy ones (Norcross, Krebs, & Prochaska, 2011; Prochaska, Redding, & Evers, 2015). The TTM explains internal behavior change with a temporal dimension that utilizes cognitive and performance-based components of change among individuals (Norcross, et al., 2011; Prochaska & DiClemente, 1982).

Stage 1

Precontemplation refers to the stage in which individuals have no intent to alter behavior in the next 6 months (Prochaska & DiClemente, 1982). This stage is usually described as individuals that are resistant or unmotivated, tending to avoid sharing information, discussion, or thought concerning health behavior (Prochaska et al.,1992). According to Prochaska and DiClemente (1982), this stage underestimates the benefits of changing behavior and places too much energy on the negatives of changing the behavior of individuals.

Stage 2

Contemplation is the stage in which people are thinking about making a positive change to healthy behavior in the near future (Sharma, 2015). During this stage, people recognize that their behavior may be a problem and focus on the pros and cons of changing behavior within the next 6 months (Sharma, 2015). People realize that their behavior may be a problem and are more thoughtful and practical about their changing behavior, although, during this stage, there is still much resistance toward change (Prochaska & DiClemente, 1982).

Stage 3

In the preparation (determination) stage, individuals are ready to move to action within 30 days. Small steps towards behavior change are implemented with the confidence that changing their behavior can result in a healthier lifestyle among individuals (Prochaska et al., 1992). Preparation is viewed as a transition rather than a stable stage among individuals intending progress (Prochaska, et al., 2015).

Stage 4

Action is the stage where people believe they have the ability to change their behavior and plan to keep moving forward with new changed behavior (Prochaska & DiClemente, 1982). This stage is the shortest of all, and the amount of time people spend at this stage differs from person to person (Prochaska & DiClemente, 1982). During this stage, individuals mentally review their commitment to themselves and create plans to address both personal and external pressures that may lead to relapse (Sharma, 2015).

Stage 5

In the maintenance stage, people have maintained their behavior change for a while with the intent of continued moving forward with the new behavior change (Norcross, et al., 2011; Prochaska & DiClemente, 1982). During this stage, people work towards preventing relapse and report the highest levels of self-efficacy (Prochaska et al.,1992). People in this stage tend to remind themselves of the amount of progress they have made; however, they are aware of thoughts of returning to old behavior patterns; they resist the temptation and stay on the right track (Prochaska et al.,1992).

Schema Theory in Reading

Bartlett (1932) first introduced the use of schemas as a basic concept as part of the learning theory, suggesting that our understanding of the world consists of a network of abstract mental structures. Piaget (1936) used the term *schema,* and its use became famous through the theory of cognitive development. According to the theory of cognitive development, children progress through a series of stages of intellectual growth (Baskale & Bahar, 2011). Piaget defined a schema as both a list of knowledge as well as the process of obtaining that knowledge and believed that people are constantly adapting to the environment as they acquire new knowledge and learn new things (McLeod, 2015; Piaget, 1936).

The fundamental principle of the schema theory is that the written text does not carry meaning alone; instead, a text provides directions for readers as to how they should develop meaning from their own previously acquired knowledge (McLeod, 2015; Piaget, 1936). A schema is a cognitive framework that helps organize information that may be useful because it allows people to take a shorter path in interpreting the most significant amount of information that is available in the environment (Cherry, 2016). Schema theory explains how readers use prior knowledge to comprehend and as a learning tool (Cherry, 2016).

According to the schema theory, comprehending a text is an interactive process shared between the reader's background knowledge and the text (An, 2015). Reading comprehension is directed in two areas: from the bottom up to the top and from the top down to the bottom among individuals (An, 2015). Efficient comprehension requires the

skill to relate the textual material to one's knowledge (Cherry, 2017). According to Strunk (1979), schemata can represent knowledge in every level from ideologies and culture truths to know about the meaning of a particular word, and patterns of excitations are associated with what letters of the alphabet students are using. The relationship of schema theory to reading comprehension also depends on how the reader uses schemata (Cherry, 2017).

Cognitive-Based Processing Model

There are several models based on cognitive processing and reading comprehension (Singer & Ruddell, 1970; Sadoski, McTigue, & Paivio, 2012). The LaBerge-Samuels model of automatic information processing focuses on the internal aspects of attention as essential to comprehension (LaBerge & Samuels, 1974). The LaBerge-Samuels model defined three attributes of internal attention, such as alertness, which is the reader's active attempt to access necessary schemata involving letter-sound relationships, syntactic knowledge, and word meaning. The second characteristic is the reader's ability to attend selectively to information that is relevant and requires processing (Sadoski, et al., 1974). The third is limited capacity, whereby the human brain has a limited amount of cognitive brain energy for use (LaBerge & Samuels, 1974). In other words, a reader's cognitive energy is centered on decoding, so attention cannot be directed at integrating, relating, and combining the meanings of the words decoded. Comprehension processing difficulties occur when the reader cannot rapidly and automatically access the ideas and knowledge stored in the schemata (Singer, et al., 1970) identified the latter kind of processing interactive-compensatory as to how the reader

compensates for deficiencies in one or more of the knowledge sources by using information from remaining knowledge sources. Those sources are more concerned with concepts and semantic connections and are termed *higher-level stimuli* in the cognitive-based processing model (Singer & Ruddell, 1970).

Social Cognitive Theory

Bandura (1961) developed social cognitive theory (SCT) out of the social learning theory in 1986, hypothesizing that learning occurs in a social context with a reciprocal interaction of the person, environment, and behavior. According to Bandura (1977), the feature of SCT is the emphasis on both social influences and external and internal social reinforcement in a social context. The goal of SCT is to explain how people regulate their behavior through control and reinforcement to achieve goal-directed behavior that can be maintained over a period of time (An & Meaney, 2015).

Bandura (2013) identified five constructs, with self-efficacy added as the sixth when the theory became SCT. Bandura identified reciprocal determination as to the first central concept of SCT, which refers to the dynamic and reciprocal interaction of individuals with a set of learned experiences, environment (external social content), and behavioral responses to stimuli to achieve goals (An & Meaney, 2015; Bandura, 2006). The second construct is behavioral capacity, a person's ability to carry out a behavior through the necessary knowledge and skills (Bandura, 2013; McCabe, Plotnikoff, Dewar, Collins, & Lubans, 2015). To perform a behavior successfully, a person must know what to do, how, and when to do it (An & Meaney, 2015; Bandura, 2006). People learn from the consequences of such an action, which also affects the environment that they live in

(Bandura, 2002). The third construct is observational learning, whereby people can observe a behavior conducted by others and then reproduce their actions (Bandura, 2006). If individuals witness a successful demonstration of behavior, they can duplicate the behavior successfully (Bandura, 1977; McCabe et al., 2015).

The fourth construct is reinforcement, which refers to the internal or external responses to a person's behavior that affect the possibility of continuing or discontinuing the behavior (An & Meaney, 2015; Bandura, 2013). This construct mostly ties to the reciprocal relationship between behavior and the environment (Bandura, 1977; McCabe et al., 2015). Reinforcements can be done by self-initiating or through the environment and can be positive or negative (Bandura, 1977; Phipps et al., 2013). The fifth construct is expectations, which is the anticipated outcome of a person's behavior. People anticipate the consequences of their actions before engaging in the behavior, and anticipated outcomes can influence positive completion of the behavior. The sixth construct is self-efficacy, which refers to the level of a person's confidence in his or her ability to successfully perform a behavior (Bandura, 2002; McCabe et al., 2015). A person's specific abilities and other individual factors influence self-efficacy.

Bandura's (2002) social cognitive theory distinguishes between three modes of agency—personal agency exercised individually, the proxy agency in which people secure desired outcomes by encouraging others to act on their behalf and collective agency in which people collaborate to shape their future. In many situations in life, people do not have direct control over the social conditions and institutional practices that

affect their life (Phipps et al., 2013). They thus seek others who have access to resources, expertise, or can act on their behalf to secure the desired outcome (Phipps et al., 2013).

The limitations of Bandura's (2002) SCT is that it assumes that changes in the environment will automatically lead to changes in the person, which may not always be accurate. The theory depends heavily on the processes of learning and, in doing so, disregards biological and hormonal predispositions that may influence an individual's behavior, regardless of past experiences or expectations (Phipps et al., 2013). The theory is loosely organized and based solely on the interactions between person, behavior, and environment (Bandura, 2001; McCabe et al., 2015). It is unclear to the extent to which each of these factors into actual behavior and which one is more influential than the other on behavior (Phipps et al., 2013).

Sociocultural Learning Theory

Vygotsky's (1978) sociocultural learning theory asserts that a learner's environment plays a pivotal role in his or her learning development. There are three key themes of the sociocultural theory: culture, language, and zone of proximal development. According to Vygotsky (1979), cultures are created through the use of tools and symbols, which makes culture the critical distinction of what differentiates humans from animals. Vygotsky wrote that a learner achieves intelligence when he or she can internalize the instrument that is being provided in the culture. When the instrument of culture evolves and emerges, the learners' ability to grow as individuals and add on to their knowledge base expands (Hawkins, 2018). Vygotsky (1978) implied that language is a direct result of the symbols and tools that grow within a culture. An individual can learn language

through a variety of social events, situations, and processes in which all contribute to language (Hawkins, 2018).

The sociocultural learning theory stands upon the idea that learners go through three stages of speech development (Hawkins, 2018). Learners must first engage in the social environment, which is called social speech, which begins around the age of 2. Secondly, they will learn private speech, which starts when learners speak their thoughts aloud around age three (Vygotsky, 1979). The last is inner speech, which starts around age seven when the learner forms ideas that remain within his or her mind and directly affect behavior or thoughts (Vygotsky, 1979). A learner's abilities are compared by instructors to that of peers when engaged in problem-solving activities (Vygotsky, 1978). The capability of what learners can do is on one end of the spectrum, and what they cannot do is on the other end of the spectrum (Hawkins, 2018).

Theory of Planned Behavior

Ajzen (1988, 1991) formulated the theory of reasoning action, later changed to the theory of planned behavior (TPB), to predict an individual's intent to engage in the behavior at a specific time. The TPB, a model used to understand health behaviors such as cardiovascular disease, cancers, and diabetes, states that the most proximal determinant of behavior is the intention to perform that behavior (Ajzen, 1991). According to Ajzen (1988, 1991), individuals will have a firm intention to, for example, eat the recommended daily number of vegetables when they hold positive attitudes towards that behavior, perceive social pressures from those whose opinions they value, and feel capable of eating the recommended daily amount. The association between TPB

variables and behaviors may differ between broad categories of behavior, such as eating healthily and increasingly specific behaviors such as food choices (Ajzen, 1991).

The TPB consists of six constructs that collectively represent a person's control over that outcome (Shirazi, Kazemi, Kelishadi, & Mostafavi, 2017). The six constructs are attitudes, behavioral intention, subjective norms, social norms, perceived power, and perceived behavioral control. Wang and Wang (2015) posited that attitude refers to the degree to which a person has a positive or negative evaluation of the behavior of interest. Behavioral intention refers to the motivational factors that influence a given behavior, whereby the stronger the intention to act on the behavior, the more likely the behavior will be performed by individuals (Ajzen & Ajzen 1988,1991; Wang & Wang, 2015). Subjective norms are the belief about whether people mostly approve and disapprove of the behavior (Wang & Wang, 2015). Social norms refer to the customary codes of behavior in a group of people or large cultural groups of people (Ajzen, 1988, 1991; Wang & Wang, 2015). Perceived power refers to the perceived presence of factors that may facilitate or affect the performance of behavior (Ajzen, 1988, 1991; Wang & Wang, 2015). Perceived power influences a person's perceived behavioral control over each of those factors. The last construct is perceived behavioral control, which refers to a person's perception of the ease or difficulty of performing or completing the behavior of interest (Ajzen, 1988, 1991). This construct varies across situations, resulting in a person having varying perceptions of behavioral control, depending on the situation (Ajzen, 1988, 1991; Wang & Wang, 2015).

The limitations of TPB include its assumption that the person has acquired the opportunities and resources to be successful in acting on the desired behavior, regardless of the intention (Shirazi, et al., 2017). Moreover, TPB does not account for other variables that factor into behavioral intention and motivation, such as fear, threat, mood, or experience (Shirazi, et al., 2017). While it does consider normative influences, it still does not consider the environmental or economic factors that may influence a person's intention to perform a behavior (Ajzen 1988, 1991). It assumes that behavior is the result of a linear decision-making process and does not consider that it can change over time (Wang & Wang, 2015). The added construct of perceived behavioral control was an essential addition to the theory, yet it doesn't say anything about actual control over behavior (Shirazi, et al., 2017). TPB has shown more contributions to public health, but it is still limiting in its inability to consider environmental and economic influences (Wang & Wang, 2015).

Theoretical Basis

The theoretical basis for this study stems from the fundamental causes theory (Phelan & Link, 1995). Between 2007-2017, a large body of evidence has demonstrated the significant differences in health between SES levels of society (Overseen, Rydland, Bambra, & Eikemo, 2017). FCT is one of the most powerful research tools to clarify the relationship between SES and health (Overseen et al., 2017). SES is commonly represented by total family income, education of parents, and occupation combined (Cheng & Wu, 2017). According to Kieffer and Lesaux (2012), understanding children's

SES and reading comprehension is critical because students' low SES may put them at a higher risk for reading difficulties.

Waters and Waters (2016) emphasized a classic definition of sociologist Max Weber's (1922) social inequality. According to Weber (2015a/1922), there are three fundamental types of inequality. The first is "social class," which is based in the marketplace. The second, and more important distinction, is based in German Stand and defined as in estimates of honor or as "status group" (Weber, 2015a/1922). The third type of stratification is "party," where power is distributed. Weber (1922) clearly defined that the two forms of stratification emerged out of two different parts of society. German Stand, one part of society with its focus on honour, emerged out of the most fundamental part of society grounded in loyalties. The Gemeinschaft is defined as where class emerge out of a sub-unit of the Gemeinschaft, rationally ordered markets and legal structures of the Gesellschaft. Waters and Waters emphasized that Weber (1922) posited that "party" emerged out of both Gemeinschaft and Gesellschaft into two types of social stratification—class and status group. Although the two types are related, they cannot be mixed, because they are fundamentally different (Waters & Waters, 2016).

Hair, et al. (2015) studied the association of child poverty, brain development, and academic problems, finding that such patterns continued into adulthood and are measured by structural brain development throughout life in the area of occupational achievement. The influence of poverty on children's learning achievement is mediated by structural brain development (Hair et al., 2015). Başkale and Bahar (2011) explored several reasons why children's diets may be inadequate, such as low levels of education of mothers, low

socioeconomic status, and insufficient family knowledge about nutrition, factors which may interfere with a child's growth and development. Mensah and Kiernan (2011) conducted a study on the effect of using various intellectual stimulating environments to speed up children's transition from the pre-operational stage to the operational stages of cognitive development. The outcome of the study suggested that children's cognitive development can be faster when they are in more intellectually stimulating conditions (Mensah & Kierman, 2011).

Oversveen, et al. (2017) conducted a study on rethinking the relationship between SES and health—making a case for sociological theory in health inequality research. The researchers examined cultural-behavioral, materialist, psychosocial, and life-course approaches and FCT. They concluded much of the empirical research on health inequalities previously relied on explanations with a static and unidirectional view of the connection between SES and health, assuming a unidirectional causal relationship between largely static categories (Oversveen et al., 2017).

Fundamental Causes Theory

The FCT includes information about the persistent and direct connection between SES morbidity and mortality over time, despite improvements in health conditions among individuals of low SES (Goldberg, 2014; Link & Phelan, 1995). FCT has provided a robust framework for thinking about health inequalities, directing attention to the higher forces behind social inequalities, and explaining how health inequalities may persist over time in spite of changing medical and social conditions (Goldberg, 2014; Link & Phelan, 1995). FCT has been supported by the work of many scholars (Diez-Roux, Kawachi, &

Levin, 2004; Link & Phelan, 1995, 2005; Phelan, Link, & Tehranifar, 2010) and cite evidence that SES represents an array of resources, such as money, knowledge, prestige, power, and beneficial social connections that protect health no matter what reasons are relevant at any given time (Mackenbuch, 2012; Phelan & Link, 1995).

According to Phelan, et al. (2010), knowledge includes literacy about the health that is gained through access to doctors and medical resources as well as the ability to read and understand medical information in the healthcare marketplace. The relationship between money and health is linear with a positive slope: the more money a person has, the better his or her health with some exceptions (Goldberg, 2015; Phelan & Link, 1995). A basic level income affords individuals with access and the ability to pay for healthcare and to purchase health insurance (Link & Phelan, 1995, 2005; Phelan, Link, Diez-Roux, Kawachi, & Levin, 2004; Phelan, et al., 2010). Having enough money plays a crucial role in health decisions. It provides the ability to afford healthy choices, such as buying nutritious food, exercise equipment, gym membership, and medications (Phelan et al., 2010). On a much larger scale, money provides the opportunity to make adaptations to the work and residential environment, such as changing jobs, retiring at the time of one's choosing, and relocating to a safer community (Mackenbuch, 2012; Phelan & Link, 1995). Power and prestige, the ability to apply one's influence to create change on behalf of oneself or others, include factors in determining an individual's place in the social hierarchy, such as the ability to take days off for personal time or have access to medical care (Link & Phelan, 1995, 2005; Phelan, et al., 2004; Phelan, et al., 2010). Beneficial

social connections are the connections between separate social worlds and social relations within closed worlds (Goldberg, 2014; Phelan & Link, 1995; Phelan, et al., 2010).

Summary and Conclusions

An in-depth literature review was completed to search findings in relation to examining the differences between third grade reading NCE scores in schools that changed to 100% FRL. First, much of the literature gave a brief history of the NSLP and the Healthy, Hunger-Free Kids Act of 2010. Secondly, the literature that I researched is related to reading comprehension, standardized testing, theories of nutrition, school health and the FCT. The literature in this chapter provides research outcomes on why this topic is important, revealing the need for research addressing the problem of reading comprehension among third grade students.

I found a gap in literature representing researchers that examined the differences between third grade reading NCE scores in schools that changed to 100% FRL. There are many contradictory views on the effectiveness and the strategies that best meet the needs of improving reading proficiency among young children. Poverty among children has an enormous negative influence on school success, with the main reason being suffering from food deprivation and poor access to adequate health care (Hair, et al., 2015). The impact of NCLB and the Reading First Initiative on the past three decades of the failure of the nation's children to read proficiently has been consistent and ongoing. However, little attention has focused on universal free lunch for all students and its impact on third grade reading comprehension. Current literature found did not cover the differences between third grade reading NCE scores in schools that changed to 100% FRL. This

study extended the knowledge related to nutrition and third grade reading NCE scores as well as fill the gap in literature. I provided the research design, methodology and data collection in Chapter 3.

Chapter 3: Research Method

The purpose of this quantitative, comparative study was to examine the impact of policy change to universal FRL on third grade NCE reading scores by comparing the different extremes of low, middle, and high levels of FRL prior to the policy change. The vast majority of research studies have focused on examining the impact of teacher support development and its effect on student academic performances (Fram, Frongillo, Fischbein, & Burke, 2014). According to Sencibaugh and Sencibaugh (2015), proficient and competent readers use metacognitive behaviors when listening to a passage, using self-questioning techniques to help to understand the material. In this study, I examined the differences in third grade NCE reading scores before and after the policy change to 100% FRL. Using an ANOVA Q3Q1 split, I compared the third grade reading NCE scores of schools the year before the switch (i.e., 2013) and the year after the switch (i.e., 2014). I used a pre- and posttest design to assess whether the means of three groups (i.e., students' third grade reading NCE scores before and after universal free lunch) are statistically and significantly different.

Research Question and Hypotheses

RQ1: What are the differences in third grade reading NCE scores before and after the policy change to 100% FRL?

H_0: $\mu^1 = \mu^2 = \mu 3$ – There are no differences in third grade reading NCE scores before and after policy change based on levels of free and/or reduced lunch prior to policy change.

H_1: $\mu^1 \neq \mu^2 \neq \mu 3$ – There are differences in third grade reading NCE scores before and after policy change based on levels of free and /or reduced lunch prior to policy change.

Research Design and Data Analysis

In this study, I examined the differences in third grade NCE reading scores before and after the policy change to 100% FRL. Using an ANOVA and a three-group, pre- and posttest design, I compared the third grade NCE reading scores of schools the year before the switch (i.e., 2013) and year after the switch (i.e., 2014). According to Campbell and Stanley (1963), the three-group, pre- and posttest design is widely used in the educational setting for research. For this study, I obtained the NCE reading scores for third grade students from the Tennessee Department of Education (2016b) website for before and after the policy change and established the differentiation between them by subtracting the NCE reading scores of 2013 from 2014.

I used an ANOVA, Q3Q1 split because the FRL prior to policy change was divided into three quartiles: Q3 at 75th percentile, Q1 at 25th percentile, and Q2 at the 50th percentile. The Q3Q1 split was conducted to assess whether the means of the DV (i.e., NCE gain scores 2013–2014) was significantly different among the three groups. The three groups were schools with lower FRL, middle FRL, and high FRL before the policy change. FRL is an indicator of SES; therefore, I wanted to see how the extreme FRL/SES schools were impacted by this policy change.

Population

The population and sampling population were the same ($N = 575$). The sampling population was the 575 schools that met the qualification for the entire student body to receive FRL under CEP (Shelby County Schools, 2016). The sampling method I used in this study was purposive and convenience sampling. I purposively selected schools that met the criteria of CEP and implemented the policy change to universal free lunch. Convenience sampling included the purposive sampling of elementary schools with third grade NCE reading scores (see Tennessee Department of Education, 2016b).

Sampling Population

The sampling population was the elementary schools in Tennessee who participated in the CEP of the Healthy, Hunger-Free Kids Act, Section 104a and made the switch to 100% FRL in 2014 (see USDA, 2015). An ANOVA with a pre- and posttest design was an appropriate research design for this study because it allowed me to compare the NCE third grade reading scores of schools the year before the switch (i.e., 2013) and year after the switch (i.e., 2014). Then, I determined the differential by subtracting the NCE reading scores of 2013 from 2014.

Sample Size

The sample size was the total number of elementary schools that switched to 100% FRL in 2014 ($N = 575$). All of these elementary schools in Tennessee participated in the CEP of the Healthy, Hunger-Free Kids Act, Section 104a and made the switch to 100% FRL in 2014 (USDA, 2014). Larger sample sizes are optimal for enhancing the ability to detect effects (Field, Miles, & Field, 2017).

Variables

Independent Variable (IV)

The IV was the universal FRL. Universal FRL was defined as meeting the eligibility criterion based on the guidelines of the CEP of the Healthy, Hunger-Free Kids Act, Section 104a that allows eligible districts and schools with high percentages of students living in poverty to receive meals at no charge (USDA, 2015). To promote reliability and validity, data from the IV group of schools that changed to FRL was derived from the official data of the Tennessee Department of Education and the CEP of the Healthy, Hunger-Free Kids Act. In looking at face validity, the NCE reading scores appear to measure what the test is intended to measure to test administrators. I conducted an ANOVA Q3Q1 split of FRL and NCE reading scores before and after the policy change. Using a quantitative, comparative design enabled me to examine which schools benefited the most from this policy change. This Q3Q1 split was conducted to assess whether the means of the DV were significantly different among the groups based on the indication of SES linked to the different and extreme groups. The three groups were defined as schools with low FRL, middle FRL, and high FRL before the policy change. Given that FRL is an indicator of SES, I wanted to assess how the extreme FRL/SES of these groups was impacted by this policy change. For example, a school at 90% FRL is considered a nonaffluent school, whereas a school that is at 20% is more affluent.

Dependent Variable (DV)

The DV was the differential of NCE reading scores in 2013 and 2014. The formula for this differential was the 2014 NCE reading score minus the 2013 NCE

reading score. For example, if a school in 2014 had an NCE reading score of 50, and in 2013 they had an NCE reading score of 46, the differential NCE reading score would be 4 (i.e., 50 - 46 = 4). The DV was defined as a way of measuring where students fall along the normal curve. NCE line numbers run from 1 to 99, which indicate an individual student's rank or how many students out of a hundred had a lower score (Ebert & Scott, 2014). One is the lowest score and 99 is the highest, and the scoring system follows the NP score when reviewing achievement test reports (Whitford et al., 2018). NCE scores have a preset mean of 50 and a standard deviation of 21.05 (Ebert & Scott, 2014). Scores of NCEs and percentiles are the same at 1, 50, and 99; however, the interpretation of scores are different (Whitford et al., 2018).

I obtained the DV scores from official school data from the Tennessee Department of Education (2016b). NCE scores are deemed to be reliable and based on an equal-interval scale, meaning the difference between any two successive scores on the scale has the same meaning throughout the scale (U.S. Department of Education, 2013). The NCE scores are valid ways to measure student's performance with the performance of other children in the same age or grade (U.S. Department of Education, 2015).

Limitations

Campbell and Stanley (1963) identified the threats to the internal validity other than the experimental treatments are history, maturation, testing, instrumentation, statistical regression, selection of participants, mortality, and interaction of history and treatment. In using the three-group, pre-and posttest design, one threat to internal validity may be historical events that have occurred other than FRL (see Campbell & Stanley,

1963). Another threat to internal validity for this study was the selection of participants in that I only collected data at the school level, not at the individual student level, and the study was limited to third grade students only.

Limitations exist within this study, such as the ANOVA design. When using the ANOVA design to compare the means of more than two groups (i.e., I compared three groups in this study, the *t* score or the *p* value can only be used to determine that the means of one pair is significantly different. The problem is that the ANOVA does not determine which pair. Another limitation was that the ANOVA assumes that the groups have the same, or very similar, standard deviations. The greater the differences in standard deviations between groups, the greater chance that the conclusion of the test is inaccurate (Field et al., 2017).

Assumptions of Design

According to Field et al. (2017), the first assumptions that underlie the use of ANOVA are that the observations are random and that the sample taken from the populations are independent of each other. The value of one observation should not be related to any other observation (Field et al., 2017).

The second assumption is the homogeneity of variances; An ANOVA assumes that the variances of the distributions in the populations are equal (Field et al., 2017). In this study assumes that the instrument of this study, the NCE scores, includes data that are compatible with SPSS, which was the statistical analysis software used in this study, and that the research population was representative of elementary children's reading scores in the third grade.

The third assumption was the assumption of normality, which means the sample population derives from a normal population (Field et al., 2017). The IV (i.e., NCE scores) was distributed in each group. I assumed that the NCE scores, included data that were compatible with the SPSS software. I took the data set directly from the Department of Tennessee website and placed it into SPSS.

Procedures for Data Collection

I obtained the data for this comparative, quantitative, ANOVA, Q3Q1 split study from the Tennessee Department of Education. The secondary data collected were entered into the SPSS software, a statistical data analysis tool used for quantitative research, for an analysis that created the results. The data set was taken from the Tennessee Department of Education website for this study.

Validity

To promote validity, I obtained data for the IV group of schools that changed to FRL from the official data of the Tennessee Department of Education and the CEP of the Healthy, Hunger-Free Kids Act. The NCE scores are valid ways to measure student's performance with the performance of other children in the same age or grade (U.S. Department of Education, 2015). One threat to internal validity of this three-group, pre- and posttest design may be historical events that have occurred other than FRL (see Campbell & Stanley, 1963). Another threat to internal validity of this study was the selection of participants in that I only collected data at the school level, not the individual student level, and the study was limited to third grade students.

Reliability

Reliability in this study are the DV scores that came from official school data from the Tennessee Department of Education (2016b). NCE scores are deemed to be reliable and based on an equal-interval scale meaning the difference between any two successive scores on the scale has the same meaning throughout the scale (U.S. Department of Education, 2013). NCE is norm-referenced test scores that compare student performance nationally or locally (Ebert & Scott, 2014). The NCE is a way of measuring where students fall along the normal curve. NCE line numbers run from 1 to 99, which indicate an individual student's rank, or how many students out of a hundred had a lower score (Ebert & Scott, 2014). The lowest score is 1 and 99 is the highest and follows the national percentile score when reviewing achievement test reports (Whitford, et al., 2018). NCE scores have a preset mean of 50 and a standard deviation of 21.05 (Ebert & Scott, 2014). Scores of the NCE and percentiles are the same at 1, 50, and 99; however, the interpretation of scores are different (Whitford, et al., 2018). Norm-reference tests are designed to rank test takers on a bell curve or distribute scores that are shaped when graphed, which form the outline of a bell (Whitford, et al., 2018).

Ethical Considerations

Given this study's secondary data analysis, I did not interview participants. Therefore, there was no interaction with the sample or access to identifying data. Thus, no likely harm was done. Ethical responsibility requires care to protect the confidentiality and integrity of the data collected according to the Institutional Review Board's (IRB) policy obtained through the Tennessee Department of Education website. This research

plan was reviewed by the IRB, which has set standards in place for students when conducting research to address ethical issues. There was no solicitation of participants; therefore, consent forms were not needed. Also, there were no known psychological effects, physical risks, or legal or economic impacts associated with collecting secondary data from the Tennessee Department of Education website.

Summary

This chapter includes the purpose of this comparative quantitative ANOVA Q3Q1 study, research question, and hypotheses. Included in this chapter are the population, sampling procedures, procedures for data collection, and ethical procedures. After the research, the results of the study, along with applicable figures and tables, are presented in Chapter 4. Study conclusions, limitations, as well as future research and practical implications are also in the next chapters.

Chapter 4: Results

Introduction

The purpose of this quantitative, comparative, ANOVA, Q3Q1 split study was to examine whether there is a statistically significant difference between third grade NCE reading scores in schools before and after the policy change to 100% FRL. The research question and hypotheses were centered on whether statistically significant differences existed between the IV of universal FRL and the DV of NCE reading scores. In this study, I used a one-way ANOVA design to compare the NCE reading scores of schools before and after the policy change to 100% FRL.

In this chapter, I offer the results of this study and discuss the data collection procedures. The data collection section leads into a section on the descriptive statistics in which I describe the characteristics of the final sample. The descriptive statistics were used to measure variability that communicates the range, quartiles, absolute deviation, and variance of the data. Subsections on the data preparation and statistical tests to address the assumptions of a one-way ANOVA are presented as a precursor to the following section focused on the statistical analysis and results. The chapter concludes with a summary of the analyzed results, a discussion, and tables.

Data Collection

The research question and hypotheses that guided this were:

RQ: What are the differences in third grade NCE reading scores before and after the policy change to 100% FRL?

H0: There are no differences in third grade NCE reading scores before and after policy change based on levels of FRL prior to policy change.

H_1: There are differences in third grade NCE reading scores before and after policy change based on levels of FRL prior to policy change.

An analysis of the one-way ANOVA shows that the NCE gain scores of 2014 minus those of 2013 failed to reject the null hypothesis, indicating there are no statistically significant differences in NCE third grade reading scores after the policy change to 100% FRL.

Walden University IRB provided me with approval number 0123190385706 on December 19, 2018 to collect data from the web-based Tennessee Department of Education site on the Tennessee Comprehensive Assessment Program third grade reading scores (i.e., the DV). However, the data did not separate third grade reading scores from Grades 3 through 8; therefore, I used NCE third grade reading scores, which captured the same data. As a result, an adjustment was made to the research question and analysis. An ANOVA was used instead of an ANCOVA due to having no covariate. The data collection process was the same, which involved downloading all pertinent data. All data were organized into one Excel spreadsheet and input into the SPSS, Version 25. I conducted descriptive analysis, and the results of this analysis are presented in the next section.

Results

Descriptive Statistics

The target population for this study was delimited to schools that made the policy change to universal FRL for third grade students. The target geographical location was the southeast region of the United States. Analysis of the descriptive statistics is presented in Tables 2 and 3. After conducting a frequency analysis of the total sample (*N* = 575), one school provided no NCE reading scores; therefore, this school was removed, which resulted in *N* = 574.

Table 2

Descriptive Statistics for NCE Gain Scores 2014 Minus 2013

					95% CI for Mean			
	N	*M*	*SD*	*SE*	LB	UB	Min	Max
Q1.00	143	.41	1.558	.130	.15	.66	-4	11
Q2.00	287	.16	1.439	.085	-.01	.32	-5	4
Q3.00	144	.17	1.686	.141	-.01	.45	-6	5
Total	574	.22	1.535	.064	-.10	.35	-6	11

Note 1. 2014 reading 3-year average NCE scores. *M* = mean; *SD* = standard deviation; *SE* = standard error; LB = lower bound; UB = upper bound; Min = minimum; Max = maximum. Q3Q1 split represents the means at three levels. Q1 is the lowest half of the data at 25th percentile. Q2 is in-between or middle at 50th percentile of the data, and Q3 is the highest 75th percentile of the data.

As presented in Table 2, I conducted the ANOVA, Q3Q1 split as one of the three points that divide the range of NCE gain scores that enabled me to examine which schools benefited the most from this policy change. The three quartiles are Q3 at 75th percentile, Q1 at 25th percentile, and Q2 at 50th percentile. Q1 are schools with low percentages of FRL, Q2 are schools with middle percentages of FRL, and Q3 are schools

with high percentages of FRL. This Q3Q1 split was conducted to assess whether the means of the DV were statistically and significantly different among the groups based on the indication of FRL/SES linked to the different and extreme groups. I conducted this split to see if this policy change impacted schools based on FRL/SES. FRL is an indicator of SES. For example, a school at 90% FRL is considered a nonaffluent school where as a school that is at 20% is more affluent.

Table 2 shows the mean scores of the three groups. NCE gain scores ranging from a mean of .17 to .41 Q1($\bar{x}$ =.41), Q2 level, ($\bar{x}$ =.16) range that indicated in between high and low levels and ($\bar{x}$ =.17) range that indicated Q3 level but with a somewhat different standard deviation ranging from scores of 1.439 to 1.686, Q1 (N = 143, .41 ± 1.558), Q2 (N = 287, .16 ±1.439), Q3 (N = 144, .17 ± 1.686) increase in NCE scores.

Statistical Assumptions

The three assumptions for one-way ANOVA (i.e., independence, normality, and homoscedasticity [homogeneity of variance] were met in this study. The first assumption addressed is the observation (i.e., independence); this was achieved by correctly randomizing sample selection and that the samples taken from the population were independent of each other. I conducted an overall ANOVA to assess the Q3Q1 split levels. The ANOVA was used to assess whether an equal number of participants in each group (i.e., the means of the DV of NCE gain scores 2014 minus 2013) were significantly different among the groups. Each group had an unequal number of participants. The mean level for each group ranged from the lower level to between high and low levels and medium to high levels in the increase in NCE gain scores.

The second assumption addressed was normality. The assumption of normality is based on the *F*-statistic, where the DV is usually is distributed equal in each group (Field et al.,2017). This assumption was met in that the DV had a normal distribution in each group.

According to Field et al. (2017), homogeneity of variance assumes that all observations came from the same underlying group with the same degree of variability (see Table 3). To address this third assumption, I used the Levene's test of quality of variances, F (2, 571) = .835, p = .434. After examining the results of the ANOVA, there were no significant violations in the assumptions of independence, normality, or homoscedasticity.

Table 3

Test for Homogeneity of Variance

		Levene Statistic	*df1*	*df2*	Sig.
NCE gain scores 2014 - 2013	Based on mean	1.028	2	571	.358
	Based on median	.835	2	571	.434
	Based on median and with adjusted *df*	.835	2	546.641	.434
	Based on trimmed mean	1.140	2	571	.321

Note. Levene's test tests the null hypothesis that the error variance of the dependent variable is equal across groups (Field et al., 2017).

As presented in Table 3, the assumption of homogeneity of variance was tested using Levene's test of quality of variances, which is but one way of determining whether there are variances between quartiles (i.e., Q3Q1) for the DV of NCE reading gain scores.

The variance was assessed as homogenous by Levene's test for variances F (2,571) =.835, p = .434. Since the p value is greater than 0.05, I failed to reject the null hypothesis and accepted the homogeneity of variance.

Table 4 presents a summary of the between groups and within groups. Since the p value is greater than 0.05, there are no statistically significant differences between group means as determined by the one-way ANOVA. The value of the F ratio is (2, 571) = 1.356, p = .259 (which is greater than .05 alpha level); therefore, a post hoc test was not warranted. See Table 4 for a complete summary of the between groups and within groups.

Table 4

NCE Gain Scores 2014 Minus 2013 ANOVA

	Sum of squares	*df*	Mean Square	*F*	Sig.
Between groups	6.377	2	3.188	1.356	.259
Within groups	1343.079	571	2.352		
Total	1349.456	573			

Figure 1. Means plot by year.

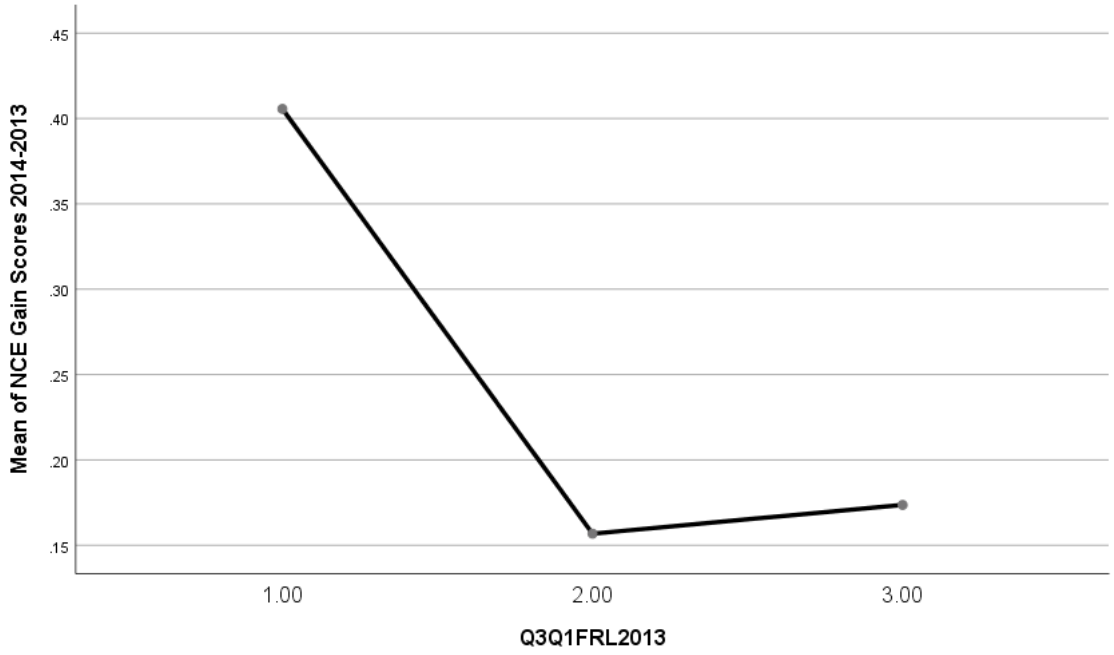

Figure 2.

The means plot in Figure 1 shows that the IV FRL Q3Q1 levels are the differential means of NCE gain scores from 2013–2014. The Q3Q1 split shows the means of the DV. There were no significant differences among the Q3Q1 split levels: Q1 ($\bar{x}$ =.41) is to the left of the means, Q2 ($\bar{x}$ =.16) is in-between the means, and Q3 ($\bar{x}$ =.17) is higher and right of the means, so there seems to be some practical differences between the groups.

Hypothesis Testing

I tested the hypothesis for the research question utilizing a one-way ANOVA to examine whether there was a statistically significant difference between the third grade NCE reading gain scores of 2014 (i.e., the year schools implemented the policy change of

100% FRL) minus the 2013 scores (i.e., the year before they implemented the policy change). The *p* value is greater than 0.05, indicating that there are no statistically significant differences between group means as determined by one-way ANOVA. The value of the *F* ratio is (2, 571) = 1.356, *p* = .259 (which is greater than .05 alpha level). The findings from this one-way ANOVA answered the research question and show that the NCE gain scores of 2014 minus the scores of 2013 failed to reject the null hypothesis, indicating that there are no statistically significant differences in the third grade NCE reading scores after the policy change to 100% FRL.

I ran a Q3Q1 split analysis of the data with FRL 2013 as the IV and a DV of the difference in third grade NCE reading scores from 2014 minus the scores from 2013. The IV of FRL included three levels: Q3 (i.e., 75th percentile and higher), which is to the right of the mean; Q2 (i.e., 50th percentile), which is in-between the mean; and Q1 (i.e., 25th percentile), which is to the left of the mean. The findings reveal that there are no statistically significant differences between group means as determined by a one-way ANOVA. No further analysis was conducted.

Summary

The findings from this one-way ANOVA answered the research question, showing that the third grade NCE reading gain scores of 2014 minus the scores of 2013 failed to reject the null hypothesis, indicating there are no statistically significant differences in NCE third grade reading scores after the policy change to 100% FRL. I provide further interpretation of these key findings as well as the limitations of the study and recommendations and implications in Chapter 5.

Chapter 5: Discussion, Conclusion, and Recommendations

Introduction

The purpose of this quantitative, one-way, ANOVA, Q3Q1 split study was to examine whether there was a statistically significant difference between the third grade NCE reading scores in Tennessee schools after a policy change to 100% FRL. The use of a Q3Q1 split enabled me to examine which schools benefited the most from this policy change, and by splitting FRL into quartiles before policy change allowed me to see if this policy benefited students in schools with lower, middle, and higher percentages of FRL, which is an indicator of SES. First, I examined if the DV of NCE reading scores was equal between groups and within groups. The findings revealed the schools with lower FRL had the highest gains in 2014. The schools with middle and high FRL percentages gained very little in NCE reading scores in 2014. Schools with high percentages of FRL were already near 100% FRL due to the highest need and lowest statuses, so they had less to gain statistically from this policy change. Whereas, schools with the lower FRL, or more affluent schools, did gain statistically from this policy change.

These findings led to the next statistical tests, the ANOVA Q3Q1 split. The three quartiles of the Q3Q1 split were Q3 at 75th percentile, Q1 at 25th percentile, and Q2 at 50th percentile, which enabled me to examine which schools benefited the most from this policy change. Splitting FRL into quartiles prior to the policy change enabled me to see if this policy benefitted students in wealthier school districts, middle-class school districts, or poorer school districts. I conducted this Q3Q1 split to assess whether the means of the DV were significantly different among the groups.

In the review of the literature, I found no extant studies that examined the difference between third grade NCE reading scores in schools that changed to 100% FRL. According to Fram et al. (2014), food insecurity is one of the challenges that can inhibit a child's school success. They also associated food insecurity among children with a range of child development, behavioral, and emotional issues. Poverty among children has an enormous negative influence on school success, with the main reason being suffering from food deprivation and poor access to adequate health care (Hair et al., 2015). The Child Nutrition Act of 1966 includes a new dimension to school food services for children (USDA, 2014). According to Section 2 of the Child Nutrition Act 1966, the connection between food and proper nutrition and the ability of children to develop and learn influenced the decision of the government to extend, expand, and strengthen such programs as the NSLP to safeguard the health and well-being of America's children as well as to advocate for the domestic consumption of agricultural and other foods by providing financial assistance to states through grant-in-aid and other revenues to meet the nutritional needs of children (Huang & Youngmi, 2015).

The findings of this one-way ANOVA answered the research question of: What are the differences in third grade NCE reading scores before and after the policy change to 100% FRL? An analysis of the one-way ANOVA showed that the NCE gain scores from 2014 minus the scores of 2013 failed to reject the null hypothesis (i.e., There are no differences in third grade NCE reading scores before and after the policy change based on levels of FRL prior to policy change, indicating there are no statistically significant differences in NCE third grade reading scores after the policy change to 100% FRL.

Interpretation of the Findings

Theoretical Foundation

The CEP programs allow LEAs and schools that met the requirements of the program to offer free meals to all children (USDA, 2015). Under the CEP, eligible districts and schools provide meal services to all students regardless of economic status (USDA, 2014). The eligibility criterion to qualify is based on the CEP meal program that allows eligible districts and schools with high percentages of students living in poverty to receive meals at no charge (Tennessee Department of Education, 2016a). The findings of this study revealed that the FCT did not support the CEP of the Healthy, Hunger-Free Kids Act of 2010, which is a universal meal plan that gives LEAs and schools in low-income areas an alternative method for operating school meal programs (see USDA, 2014). Conversely, the results suggest that the schools with the lower FRL percentage schools had the highest gains in NCE reading scores in 2014 based on the indication of SES linked to the different and extreme groups. FRL is an indicator of SES. For example, a school at 90% FRL is considered a nonaffluent school, whereas a school that is at 20% FRL is more affluent. The middle and high FRL schools gained very little. The high FRL schools did not gain as much as the lower FRL schools. The high FRL schools were already near 100% FRL, due to having the highest need and lowest SES, so they had less to gain statistically from this policy change. Whereas, schools with the lower FRL, or more affluent schools, did gain statistically from this policy change.

According to Kieffer and Lesaux (2012), understanding children's SES and reading comprehension is critical because students' low SES may put them at a higher

risk for reading difficulties. The high FRL schools were already receiving a higher FRL due to having the highest need and lowest SES. According to Brown and Bilski (2017), school lunch is the only nutritious meal many students eat all day; however, eating FRL has a stigma, and despite the need, 1 in 3 eligible students skipped lunch to avoid the shame. Children that qualify for FRL at the lower FRL schools may not have wanted to eat lunch as a result of the label and stigma of receiving FRL (see Brown & Bilski, 2017).

The CEP pilot began in selected states in the 2011–2012 school year and became available nationwide for the 2014–2015 school year for all states eligible to participate, enabling high-poverty schools and school districts to reduce hunger and making school meals programs more efficient to children (USDA, 2015). CEP has been implemented in 11 states and serves approximately 4,000 high-poverty schools (USDA, 2014). Schools can provide breakfast and lunch free to students enrolled in CEP without having families complete an application process (USDA, 2015). Schools that accept the pilot program are reimbursed using a formula that calculates the percentage of students categorically eligible for free meals based on their participation in other programs, such as the Supplemental Nutrition Assistance Program and Temporary Assistance for Needy Families, which are identified as other specific means-tested programs (USDA, 2015).

No Child Left Behind Act of 2001

In January of 2001, President Bush introduced NCLB as the framework for bipartisan education reform for students (U.S. Department of Education, 2014). NCLB reauthorized the Elementary and Secondary Education Act 2001, which is the primary federal law on kindergarten through high-school education (Kirkham & Lampley, 2014).

The four principles of the NCLB are (a) accountability, by requiring states to put in place statewide accountability systems based on challenging state standards in reading and mathematics; (b) more choices for parents and students, especially those attending low-performing schools; (c) more local control and flexibility for states and LEAs in the use of federal education funds; and (d) a focus on what works based on scientific research with a stronger emphasis on reading, in particular for young children (U.S. Department of Education, 2015). According to Kirkham and Lampley (2014), in September of 2011, the U.S. Department of Education enacted the requirements that students read on grade level by 2014.

The findings of this study suggest that children did not show an increase in reading after the policy change to 100% FRL. According to Kieffer and Lesaux (2012), understanding children's SES and reading comprehension is critical because students' low SES may put them at a higher risk for reading difficulties. The impact of NCLB and the Reading First Initiative over the past 3 decades of failure of the nation's children to read proficiently has been consistent and ongoing (U.S. Department of Education, 2015). There continue to be many contradictory views on the effectiveness and strategies that best meet the needs of improving reading proficiency among young children, with several studies being conducted on nutrition, education, and SES.

I used a multiple, comparison, analysis Q3Q1 split of the data for FRL 2013 as the IV and the DV of differential NCE reading scores from 2014 minus the scores of 2013. The lower FRL percentage schools had the highest gains in 2014, while the middle and high FRL schools gained very little. The high FRL schools scores were already near

100% FRL due to having the highest need and lowest statuses, so they had less to gain statistically from this policy change. Conversely, lower FRL, or more affluent, schools did gain statistically from this policy change.

According to Phelan et al. (2010), general knowledge includes literacy about the health that is gained through access to doctors and medical resources as well as the ability to read and understand medical information in the healthcare marketplace. The relationship between money and health is linear with a positive slope: The more money a person has, the better his or her health is, with some exceptions (Goldberg, 2014; Phelan & Link, 1995). Power and prestige, the ability of a person to apply their influence to create change on behalf of themself or others, including factors in determining an individual's place in the social hierarchy, such as the ability to take days off for personal time or have access to medical care (Link & Phelan, 1995, 2005; Phelan et al., 2004; Phelan et al., 2010). Beneficial social connections are the connections between unrelated social worlds and social relations within closed worlds (Goldberg, 2014; Phelan & Link, 1995, 2013).

Başkale and Bahar (2011) explored several reasons why children's diets may be inadequate, such as low levels of education of mothers, low SES, and insufficient family knowledge about nutrition, which are factors that may interfere with a child's growth and development. The results of the experimental group's knowledge about nutrition and nutritional behaviors positively changed. Mensah and Kiernan (2011) conducted a study on maternal general health and cognitive development and behaviour in children through

the early years. The results linked a clear relationship between maternal general health and children's learning and cognitive development.

Conversely, the results of this study suggest findings that schools who provide lunch through the Community Provision Act had a higher percentage of students on FRL before the policy change and showed no statistically significant difference in reading gains after the policy change to 100% FRL. This finding can be explained by the fact that high FRL schools' scores had nowhere to go because they were already receiving close to 100% FRL. The schools with the lowest FRL percentages gained because they had more opportunities to. I found no studies to date that have examined the differences in third grade NCE scores before and after the policy change to 100% FRL.

The theoretical basis for this study stemmed from the FCT (see Phelan & Link, 1995). Between 2007–2017, a large body of evidence has demonstrated the significant differences in health between SES levels in society (Overseen et al., 2017). The FCT is one of the most influential research attempts to clearly establish the relationship between SES and health (Overseen et al., 2017). SES is commonly represented by total family income, education of parents, and occupation combined (Cheng & Wu, 2017). Hair et al. (2015) studied the association of child poverty, brain development, and academic problems, finding that such patterns continued into adulthood and are measured by structural brain development throughout life in the area of occupational achievement. The influence of poverty on children's learning achievement is mediated by structural brain development (Hair et al.).

Oversveen, et al. (2017) conducted a study on rethinking the relationship between socioeconomic status and health, making a case for sociology theory in health inequality research. The researchers examined cultural-behavioral, materialist, psychosocial and life-course approaches and FCT. They concluded that much of the empirical research on health inequalities previously relied on explanations with a static and unidirectional view of the connection between SES and health, assuming a unidirectional causal relationship between largely static categories (Oversveen et al., 2017).

I found no studies to date that have examined the differences in third grade NCE scores before and after the policy change to 100% FRL; there were no results for comparison or contrast. I added a dimension to the literature by introducing the differences between schools that are lower (percentage) in FRL and are benefiting the most in NCE reading gains. Further research is needed to examine educational organizations in their effects to increase NCE reading scores to address the document problem of poor reading scores among third grade students.

Limitations of the Study

Limitations exist with this study in the use of secondary data. In this study, the population of students in the sample schools' confidentiality was protected. Also, other variables such as zip codes, age, ethnicity, and specific age of respondents can create residual confounding when omitted variables are important covariates to control for in the secondary analysis (Cheng & Phillips, 2014). Another limitation, as mentioned in Chapter 1, exists with this study**,** such as the data was only available at the school level and not the individual student level. Inclusion of additional variables such as zip codes,

specific age, and SES of individual respondents who are now receiving FRL because of the policy change and their reading scores before and after the policy change may better offer more insight of FRL and reading scores. The data also was limited to third grade students only. I did not compare the same students from 2013 and 2014 but different third grade reading classes, I followed the purpose of my study to compare the policy from 1 year to 1 year by three different groups. Another limitation is that this study was limited to schools in the southeast region of the United States, where all data was obtained for this study from the Tennessee Department of Education website. Another limitation in using the ANOVA design is it assumes that the groups have the same, or very similar, standard deviations. The greater the differences in standard deviations between groups, the greater chance that the conclusion of the test is inaccurate (Field, et al., 2017). To address this limitation, I used a Q3Q1 split to examine NCE gain scores ranging from a mean of .17 to .41, Q1level, ($\bar{x}$ =.41), range in the Q2level, ($\bar{x}$ =.16) range that indicated in between high and low levels and ($\bar{x}$ =.17) range that indicated Q3level, but with a somewhat different standard deviation ranging from scores of 1.439 to 1.686, Q1 (N = 143, .41 ± 1.558), Q2 (N = 287, .16 ±1.439) Q3 (N = 144, .17±1.686) increase in NCE scores.

Recommendations

I examined the differences between third grade reading NCE scores in schools that changed to 100% FRL before and after the policy change. I did not consider other predictors, such as age, gender, limited English proficiency, and students with disabilities as possible influences or effects because my study did not include demographics. By

adding demographics statistics to look at SES, racial, and ethnic disparities as contributing variables and predictors associated with FRL may better inform findings by addressing predictors associated with FRL policy change and the impact on NCE reading gain score. The inclusion of additional variables may better inform findings by addressing predictors associated with reading comprehension among third grade students. Although other predictors were not included in this study, I followed the purpose of this study to examine the differences between third grade reading NCE scores in schools that changed to 100% FRL before and after the policy change. This finding raises the question of if other grade levels reading scores are impacted that receive FRL due to policy change.

I examined the differences between third grade reading NCE scores in schools that changed to 100% FRL before and after the policy change. A qualitative exploratory case study design with a small group of students with structured interviews for data collection and questionnaires could have the potential for a better understanding of schools, which benefitted more such as schools with low FRL percentages. Such structured interviews with students may include but not limited to questions about given options of a variety of food choices for students to choose from to encourage and increase a better intake of lunch. The data collected will then be compared to NCE reading scores of schools with high percentages of FRL and not given the opportunity to choose from a variety of lunch food options. Although data from this study show that the schools with low FRL percentages made the most improvement in NCE gain reading scores; however, it is unknown if it is because children that qualify for FRL at the schools with low FRL

may not have wanted to eat lunch as a result of the label and stigma of receiving FRL. According to Brown and Bilski (2017), school lunch is the only nutritious meal many students eat all day; however, eating FRL has a stigma, and despite the need, one in three eligible students skipped lunch to avoid the shame. A mixed-methods design study may be helpful in identifying the use of theoretical lenses as it relates to gender, race/ethnicity, and class.

Educational institutions, government agencies, policymakers, and community stakeholders may find this study to be useful when looking at various approaches to embark on new strategies to improve student learning. The focus on the CEP of the Healthy, Hunger-Free Kids Act of 2010 is to enable high-poverty schools and school districts to reduce hungry children and make school meals programs more efficient (USDA, 2015). Kieffer and Lesaux (2012) posited that understanding children's SES and reading comprehension is critical because student's low SES may put them at a higher risk for reading difficulties. Hopefully, this study will not influence a decrease in resources to improve positive educational outcomes for children in low SES but to encourage additional resources to address the documented problem of third grade reading comprehension scores.

Implications

I embarked on this study to add to the body of literature to address the problem of third grade reading comprehension. The outcome of this study did not yield a statistically significant difference in NCE gain scores for the year 2014 minus 2013. This study offers the potential to raise awareness of universal FRL and the impact on reading

comprehension among third grade students, enabling administrators to implement action steps to close the gap on the documented problem of low reading comprehension among third grade students (Spencer, et al., 2019).

Reading is a complex series of steps that depend on several factors (Yildiz & Cetinkaya, 2017). According to LaBerge and Samuels (1974), automatization theory holds that attention as a prerequisite to both reading fluency and reading comprehension. Prior to children entering school and before learning to read, children learn vocabulary primarily from interactions socially with people in their environments (Quinn, et al., 2015). Rates of vocabulary development among children vary widely with some of this variability accounted for by differences in parent language and family background factors (Quinn, et al., 2015).

Since 2001, NCLB literacy has become the center of attention for educational legislation to provide more resources to enhance reading skills for children by the end of his or her third grade year (U.S. Department of Education, 2015). To meet this goal, the new Reading First Initiative was introduced that would significantly increase the federal investment in scientifically based reading instruction programs for children in early grades. (Gurses & Bouvet, 2015; U.S. Department of Education, 2015).

Implications from this study given the findings are that additional statistical tests to examine the difference of universal FRL and the impact on NCE third grade reading scores with studies are needed to look at more than one year of data. Also, additional statistical tests to examine other variables such as demographics of race, age, gender, limited English Proficient, and students with disabilities to study the difference of

universal FRL and the impact on NCE third grade reading scores. A mixed-methods design study may help identify the use of theoretical lenses as it relates to gender, race/ethnicity, and class. Another implication is an additional statistical test to examine the differential of students with lower percentages of FRL (schools) and the impact on NCE third grade reading scores after the policy change to 100% FRL for the entire student population within the school. A qualitative exploratory case study design with a small group of students conducting structured interviews for data collection and questionnaires could have the potential for a better understanding of schools, which benefitted more, such as schools with low FRL percentages.

Conclusion

The process of reading proficiency is one of the necessary fundamental skills that enhance academic success in schools (Capellini, et al., 2015). In the United States, having the ability to read has essential links to how much a person can achieve in his or her personal and professional life (Fives et al., 2014). The limitation of this study is that I did not compare the same students from 2013 and 2014 but different third grade reading classes; however, this is fine given the purpose of my study was to compare the policy from one year to one year by three different groups. The findings from this study may have the potential to influence social change by providing the educational system information to raise awareness of the reading scores of schools that serve free lunch to students, thereby bringing about policy changes in the USDA's core nutrition program for free lunch to children regardless of SES. An additional finding is an increased

understanding of the statistically significant differences between third grade reading NCE gain scores in schools that changed to 100% FRL before and after the policy change.

However, the findings yield there are no statistically significant differences between third grade reading NCE gain scores in schools that changed to 100% FRL after the policy change. This study suggests that USDA, policymakers, and educational institutions pay attention when establishing policies and procedures related to students from low SES backgrounds. This study brought attention to the policies and procedures as being the same for schools with middle to high SES to receive the same services such as 100% FRL because they are geographically located in a school district with high percentages of students with low SES. The policy does not benefit low SES schools, which it was intended to do. Utilizing the information from this study, in part or whole, educational institutions, policymakers, and community partners have the opportunity to make decisions and provide funds to address the problem of poor reading skills among third grade students.

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